

In re Appln. of Nanping Wu
Application No. 09/891,576

REMARKS

Applicant submits this response to the Office Action that was originally dated on July 18, 2002, but was lost in delivery to applicant. Applicant has concurrently filed a Petition to Revive this application for unintentional abandonment thereof. Pursuant to 37 C.F.R. §1.111, applicant respectfully requests reconsideration of each and every grounds for the rejection for the claims in the outstanding Office Action.

Various claims were rejected for indefiniteness and use of certain terms therein. Applicant has amended the claims to provide better consistency and terminology of the claims, incorporating the Examiner's requested changes. Applicant respectfully submits that the claims currently presented define the invention in such particularity as would particularly point out and distinctly claim the subject matter which applicant regards as his invention. Accordingly, applicant submits that the §112, ¶2 rejections have been overcome.

The Office Action rejected claims 1, 2, 5-6, 12 and 15 under 35 U.S.C. §102(e) as being anticipated by Dienhart et al.'s U.S. Patent 6,357,522 ("Dienhart et al."). According to the Office Action, Dienhart et al. discloses a multi-channel flat tube that comprises a plate body with generally planar heat transfer surfaces wherein a duct is formed with an elliptical cross section.

Applicant notes that Dienhart et al., to the extent that the Office Action relies on a February 5, 2001 filing date for its status as prior art, may be removed as a reference upon the submission of a Rule 131 declaration. In any event, applicant respectfully submits the Dienhart et al. does not disclose the features of applicant's invention. Fundamentally, Dienhart et al. is not directed to a plate freezer or the like. Instead, Dienhart et al. relates to a tubular heat exchanger in an air conditioner for use in a motor vehicle. Apart from this fundamental distinction, Dienhart et al. does not disclose refrigerant passing through a duct at a flow rate and pressure sufficient to provides a freezer operating temperature in conformance with applicant's claims.

Similarly, applicant submits that the rejection of claim 1 as being anticipated by Kato U.S. Patent 5,768,782 ("Kato") is improper. As with Dienhart et al., Kato is deficient in several respects. Importantly, Kato discloses a flat "single plate" with depressions formed therein so that when the plate is bent (at projected portion 3), the heat exchanger is formed. Thus, Kato does not disclose a freezer plate body with planar heat transfer surfaces that define a plate body solid volume. It necessarily follows that Kato does not disclose a duct formed within the plate body solid volume.

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For the same reasons, applicant respectfully traverses the Examiner's rejection of claims 2, 17 and 30 under 35 U.S.C. §103 as being obvious based on a combination of Kato and Dienhart et al. As explained above, Kato does not disclose a plate body solid volume. Instead, Kato discloses a bent flat sheet which is pressed together to form heat exchanging pathways. For this reason, it is unclear how Kato's heat exchanger could be modified by Dienhart et al. to provide applicant's invention, as suggested in the Office Action. Indeed, it is likely that Kato's opposed sheets would come apart from each other if modified as suggested in the Office Action.

Moreover, applicant submits that the references cited by the Office Action in rejecting the claims for obviousness are not "analogous" prior art. *See In re Clay*, 966 F.2d. 656 (Fed. Cir. 1992). The question of whether a prior art reference is analogous involves the determination of two criteria: (1) whether the art is from the same field of endeavor, regardless of the problem addressed; and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. *See In re Clay*, 966 F.2d at 658-59. In this instance, the subject matter of the claims is directed to the plate freezer art. The mere fact that the references cited by the Examiner generally relate to heat exchangers, intended for use in other applications such as for automobile air conditioners (Dienhart et al., Matsuo et al.), tractor trailers (Johnson et al.), air dryers (Dowling), and kimchi jars (Seol), is inapposite.

Apart from this distinction, unlike the problems addressed in the references cited by the Examiner, the problem addressed by applicant is that of providing a thermo-dynamically suitable refrigerant that may be used in a plate freezer without destroying the environment. (See specification at p. 2, ll. 9-28.) The specification further indicates that there are inherent difficulties in operating a carbon dioxide refrigerant such that it may withstand the stress levels and the like found at higher pressures, such as in the case of "shutdown" or the like of the freezer (see p. 3, ll. 5-19), particularly when heat exchanger materials such as aluminum are utilized. Accordingly, the obviousness rejections should be reconsidered and withdrawn for this reason.

Apart from the non-analogousness of the cited art, the rejection of claims 3 and 4 as obvious based on Dienhart et al. or Kato further in view of Perryment et al. U.S. Patent 5,860,471, is likewise improper. Perryment et al. discloses a conventional heat exchange device for use in a plate freezer. It does not add the missing features of claims 3 and 4, even if it were somehow combined with Dienhart et al. and/or Kato. Moreover, there is no reason or suggestion to do so inasmuch as Dienhart et al. and Kato do not relate to the plate freezer art.

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Applicant respectfully traverses the rejection of claims 5, 6, 18, 19, 31 and 32 as obvious based on the combination of Kato in view of Matsuo et al. U.S. Patent 5,927,102. As noted above, Matsuo et al. discloses a condenser for use in an air conditioner in a motor vehicle. It is unclear how Matsuo et al. could be used to modify Kato to include the missing elements, such as a solid plate volume with a duct extending therethrough in a serpentine manner, as proposed in the Office Action. Instead, the modified Kato arrangement would, at most, be formed from a bent sheet. Thus, it appears as though the Office Action is using the teachings of applicant's disclosure in order to provide missing elements, such as a duct formed "in a serpentine manner in order to get a smoother flow."

Similarly, the rejection of claims 5, 19 and 32 based on Kato further in view of Matsuo et al. is likewise inappropriate. As explained above, Kato is a bent plate heat exchanger, not a solid volume. In any event, Kato may not properly be combined with Matsuo et al. to provide such a serpentine arrangement and as claimed by applicant. Among other reasons, there would be no motivation to so combine these references and it is unclear how the plate in Kato could be so modified.

The Office Action rejected claims 7, 20 and 33 as simply a matter of design choice with respect to the number of passes of the serpentine duct through the plate body. As apparently conceded by the Office Action, no prior art reference suggests or discloses each of the recited elements. Accordingly, applicant requests reconsideration of the rejection and allowance of these claims.

The same comments also apply to claims 8, 21 and 29 which further recite a ratio between the total ellipse area and the total cross-sectional freezer-plate area as being between about .57 and about .67. As explained in the applicant's disclosure, utilizing such a ratio is not simply a matter of design choice but should be accorded patentability.

Claims 9, 22 and 34, as noted in the Office Action, state further specific ratios between the first diameter and the second diameter. Again, the specification explains why such diameters provide improved results which are not found in the prior art relied on by the Examiner. Accordingly, these claims are allowable for these additional reasons.

The Office Action rejected claims 10, 12, 15, 23, 25, 28, 35, 37 and 40 under 35 U.S.C. §103(a) as being obvious based on a combination of Kato in view of Johnson et al. U.S. Patent 5,320,167 ("Johnson et al."). The Office Action concludes that Kato fails to disclose that the refrigerant passing through the evaporator is a CFC refrigerant or carbon dioxide. While Johnson et al. discloses an air conditioning and refrigerant system using a cryogen, it is intended for use in a tractor trailer. Applicant submits that it would not be obvious to merely use that teaching in Kato's arrangement, particularly in view of the fact that

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Kato forms a heat exchanger by bending a formed plate together, to render these claims obvious.

The same observations apply to the Office Action's rejection of claims 11, 13, 24, 26, 36 and 38. According to the Office Action, these claims are obvious based on Kato in view of Gilley et al. U.S. Patent 5,737,923 ("Gilley et al."). However, Gilley et al. is directed to a thermoelectric device which appears to be an entirely different application as compared to Kato. In any event, neither reference discloses or renders obvious the subject matter of applicant's claims 11, 13, 24, 25, 36 and 38.

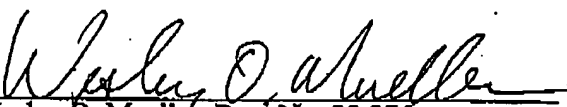
Claims 14, 27 and 39 were rejected as being obvious in view of Kato in view of Dowling U.S. Patent 4,235,081 ("Dowling"). As noted in the Office Action, Dowling is directed to a compressed air dryer. The deficiencies in Kato have been described above. For those reasons, claims 14, 27 and 39 are allowable.

Claim 16 was rejected as obvious based on Kato in view of Seol U.S. Patent 6,006,533 ("Seol"). As noted in the Office Action, Kato does not disclose that the temperature within the compartment is less than or equal to 0° degrees Celsius. As with the above rejections, the Office Action appears to have merely picked and chosen selected teachings in Seol, and combined them with Kato to fill missing gaps in these references. Applicant thus requests reconsideration and withdrawal of the rejection of claim 16.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,


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